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tricity must be judged by experts. The weight of his predictions as to future discoveries would be greater if his judgment on things in general were less unsound. It is passing strange that such loose reasonings can find a publisher. It is to be hoped that they will gain little credence from his readers. A line from Plato's Republic applies here (changing a word) to wit: "I verily believe that it is a more venial offence to be the involuntary cause of death to a man than to deceive him concerning scientific truth."

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BOTANICAL NOTES.

A NEW LABORATORY MANUAL.

DR. CLEMENTS and Principal Cutter, the former of the botanical staff of the University of Nebraska, and the latter of the Beatrice (Nebr.) High School have brought out what must prove to be a very helpful book for those teachers of Elementary Botany who wish to give their pupils a good course in laboratory work. There has been an increasing demand on the part of University professors that the high schools should lay such a solid foundation in the sciences that the subsequent work in the university could safely be built upon it. This has wrought a radical change in the methods of teaching chemistry and physics in the high schools which fit their pupils for university entrance. For many years some of the botanists have been demanding laboratory training in elementary botany for Freshmen entrance, but while the schools have made some progress, it is a curious fact that no serious attempt has hitherto been made to supply the high schools with a scientific manual comparable to the many excellent works of this character in chemistry and physics.

The authors of the 'Laboratory Manual of High School Botany' have attempted to make a book which is at once practicable in the average high school, as well as strictly scientific. The pupil who covers the work here laid out will be prepared to go forward in college and university classes without the necessity of unloading and unlearning a lot of rubbish, while at the same time if he should go no further with his studies he has had the satisfaction of knowing that he is in the possession of a considerable

body of useful information in regard to the structure and actions of plants. The general plan of the book may be obtained by a glance at the titles of the chapters, as follows: General Directions, Plant Structure, or Histology, Structure and Classification, Phytogeography, Synopsis of the Larger Groups of the Vegetable Kingdom, Physiology, Appendix (containing suggestions to teachers), and Glossary.

ORIGIN OF THE HIGHER FUNGI.

MR. GEORGE MASSEE, the well-known mycologist of Kew, speculates (in Linn. Soc., *Jour. Bot.*, vol. xxxiv., p. 438) as to the origin of the group of fungi known as the Basidiomyceteae, which includes those genera generally regarded as the highest of the hysterophytes, viz, the puff-balls and their relatives, and the various forms of toadstools and mushrooms. Finding that the conidial fructification of certain Ascomyceteae bears some resemblance to the spore-bearing tissues of the Basidiomyceteae, he finds a series of more or less obvious gradations, and arrives at the conclusion that there is a genetic connection between them. According to this view some plants are Ascomyceteae as to their ascigerous, and Basidiomyceteae as to their conidial fructifications. While ingenious, it is not likely that this theory will be generally accepted.

SUPPLEMENT TO NICHOLSON'S DICTIONARY OF GARDENING.

STIMULATED, perhaps, by the publication of Bailey's 'Cyclopedia of American Horticulture,' the publisher of Nicholson's 'Dictionary of Gardening' (Gill, London) announces a '1900 Supplement' which is to appear in two volumes. The first of these supplementary volumes has come to hand, and fully justifies the statement of the publisher as to the quality of subject matter and mechanical execution. The illustrations are superb, in many cases being reproduced directly from photographs. Upon the appearance of the second volume a more extended notice will be made.

NEW EDITION OF PRANTL'S LEHRBUCH.

DR. PAX of Breslau has brought out the eleventh edition of the well-known 'Lehrbuch der Botanik' of the lamented Dr. Prantl, first

published in 1874, and much used some years ago in American colleges. It speaks well for the teachers of botany that this book has proved so popular as to have gone through so many editions, in spite of the fact that it has not departed essentially from the scientific sequence of topics, neither has it attempted to introduce popular 'natural history' features in place of the more difficult laboratory requirements. The book contains three 'parts,' the first of which deals with structural, the second with physiological, and the third with systematic botany. It may still be held up as a model worthy of being followed by makers of botanical text-books.

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THE COAL FIELDS OF CHINA.

PROFESSOR DRAKE, of Tien-tsin, has lately published a report on the coal fields in Shan-si province, which he visited last autumn, especially those around Tse-chau, which were first made known to the world by Baron von Richthofen in 1870, and for the working of which concessions have been granted to an Anglo-Italian company. According to the abstract in the London *Times*, the journey from the coast is made across low-lying plains, and then a plateau is ascended, on which the coal measures are found. The workable coal lies in one bed, about 250 feet above a flint-bearing limestone stratum, below which it is possible that there is also coal. In Tse-chau the average thickness of seam is probably not less than 22 feet, and at one place it is worked through a shaft 329 feet deep. Streaks of shaly coal are common in the part being mined, but there is no waste coal taken out, and the proportion of ash is little more than 10 per cent. There is no waste material in the bed in any of the mines. Professor Drake estimates that within the 150 square miles around Tse-chau there are about 3000 million metric tons of coal, and it "must be remembered that this area is only a little of the ragged edge of the great coal fields of Shan-si. Most of Shan-si has been found underlaid by large coal beds. Richthofen estimates that the anthracite coal alone of Shan-si

amounts to 630,000 million tons, and that the coal area is greater than that of Pennsylvania." All the Tse-chau coal is anthracite, with a specific gravity of 1.5, and it is hard enough to support any weight put upon it in the blast furnace. The proportion of sulphur is uniformly low, and that of ash also. A cursory examination of the outcrops showed the iron ore stratum to be 2 feet to 3 feet in thickness; the workings are limited to this narrow strip because the ore beds lie near the surface and can be mined by open pits, whereas elsewhere deep shafts and long tunnels would be needed. But the small quantity of ore will probably never justify extensive mining at a depth. Besides coal and iron ore the district yields fire clays of good quality for bricks and cheap pottery. These are now much used by the Chinese for household utensils. Sandstone occurs in abundance and is extensively used by the Chinese; its fault is great friability. Massive limestones are in great abundance and of good quality. They vary in color from light gray to blue and almost black. The soil is largely *loess*, and is therefore fertile and highly cultivated, a dense population being supported by agriculture. The industries are centered round the mines. Nearly all the coal is mined through shafts varying in depth from 50 ft. to over 300 ft. Very little is mined through inclines. No steam is used for raising the coal to the surface, and explosives are not employed. The work is done with the windlass and pick. Tunnels are run through the bed from the bottom of the shaft, and at intervals along the tunnels large quantities of coal are removed, leaving circular chambers 40 ft. to 50 ft. in diameter, and thus about 50,000 tons a year are brought to the surface in the district. For local use, the coal is carried away in little carts drawn by oxen, but most of it is taken down the mountains by pack animals, as the paths are very steep and rough. It is 20 miles to the plains; the paths are about 13 ft. wide and are paved with stone. But "the great thickness and the almost horizontal position of this coal bed make it practicable, as suggested by Richthofen, for other Shan-si coal beds, to run long lines of railroad tunnels through the bed, and load the cars in the mines for distant transportation."